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## ZOOLOGY.

**The Sensory Canal System of Chondrosteans**—Collinge has studied especially *Polydon*, *Psephurus* and *Acipenser*. He cannot assent to naming every branch a canal but prefers to consider sensory organs, pits, pores, canals, etc., as parts of one sensory canal system. In this we have to distinguish the canals, the parts of which are named. The term cluster pores (=peripheral organs of allis) is given to the pores of fine dermal canals running from the main canals or branches; the pinhole pores of many authors are called primitive pores from the fact that they occur on the most generalized forms. Unbranched canals radiating from certain centres on the head, and with an ampulla near the proximal end are called ampullary canals. All of the different kinds of sensory organs are grouped under that name. The system in *Polyodon* is described for the first time. It contains all the structures except the ampullary canals, which have not been found except in Elasmobranchs. The parts are described with some detail, as is also their innervation. In the matter of the cranial nerves many corrections and additions are made to Van Wijhe's well-known description, especially in regard to the ramus oticus of the trigeminal and the ramus mandibularis of the facial.

*Psephurus* agrees pretty well with *Polyodon* but *Acipenser* is very different. The first two show marked Elasmobranch features while the latter has Teleostean tendencies. Collinge is inclined to support the validity of the group Ganoids and to accept its division into Selachoid and Teleostoid groups, the *Acipenseridæ* serving to connect the two. While the canal system in its broader features seems to confirm, in this respect, the evidence obtained from other organs, Collinge doubts if it can be employed in any except the most general manner.

**The Hypophysis.**—Lundborg has studied the hypophysis in teleosts and batrachians and concludes<sup>1</sup> that it arises as a paired structure from the deeper or nervous layer of the ectoderm, its two halves later fusing. At first there is an hypophysial stalk, short and solid, which later disappears. The future growth is one of folding, etc. The glandula infundibuli are later in arising from the infundibulum and a vertical communication always exists between infundibulum and gland.

<sup>1</sup> Zool. Jahrbücher, Abth. Anat. u. Ont., vii, 1894.

At first the gland consists of a single layer of round embryonic cells but it later becomes differentiated into two cell layers, the one of large capsular cells, the other of smaller triangular cells which lie between the apices of the others. Nothing new is given regarding the phylogeny of the organ.

**The Species of Bothriocephalus.**—From a recent article by R. Blanchard<sup>2</sup> the following key may be compiled as an index to the species of the collective genus *Bothriocephalus*:

- |   |   |  |                                       |   |
|---|---|--|---------------------------------------|---|
| 1 | { | Genital organs single  | . . . . .                             | 2 |
|   | { | Genital organs double  | . . . . .                             | 4 |
| 2 | { | Genital openings lateral (marginal),                         | <i>Bothriotænia</i> Railliet, 1894.   |   |
|   | { | Genital openings ventral or dorsal,                          | . . . . .                             | 3 |
| 3 | { | Penis, vulva and uterus open ventro-<br>median,              | <i>Bothriocephalus</i> Bremser, 1819. |   |
|   | { | Penis and vulva ventro-median; uterus<br>opens dorso-median, | <i>Ptychobothrium</i> Lönnberg, 1889. |   |
| 4 | { | Penis, vulva and uterus open ventrally,                      | <i>Krabbea</i> R.Bl., 1894.           |   |
|   | { | Penis and vulva ventral; uterus opens<br>dorsally,           | <i>Diplogonoporus</i> Lönnberg, 1892. |   |

*Bothriotænia*, type species *B. longicollis* (Molin), contains besides the type species, *B. fragilis*, *B. infundibuliformis*, *B. rugosus* and *B. suecicus*.

*Bothriocephalus* (type *B. latus*) contains *B. latus*, *B. cordatus* and *B. cristatus* found in man; a large number of species found in mammals, birds, reptiles and fishes.

*Ptychobothrium* contains *Pt. belonis*, *claviceps* and *punctatus* found in fishes.

*Krabbea* is founded upon a large 10 m. tapeworm recently found by Ijima and Kurimoto (Journ. Coll. Sc., Tokyo, 1894, IV, pp 371-385, Pl. XVIII) and contains besides this type *Kr. fasciata*, *Kr. variabilis* and probably *Bothriocephalus tetrapterus* and *B. antarcticus*.

*Diplogonoporus* Lönnberg, 1892 (= *Amphitretus* R.Bl., 1894) contains *A. wagneri* (Monticelli) and *A. lonchinobothrius* (Monticelli).—C. W. STILES, Washington, D. C.

**Batrachia of Vincennes, Indiana.**—The following list of the Urodela found in the vicinity of Vincennes, Ind., includes only such

<sup>2</sup>Notices sur les Parasites de l'Homme: iv, Sur le *Krabbea grandis*, et remarques sur la classification des Bothriocéphalines; Compt. rend. Soc. Biol, 1894, pp. 699-702.

as I have captured myself. I have often assisted in draining ponds and clearing swamps and have secured many specimens in that way. I have also been a laborer for many years in a sawmill and often find eggs, larvæ, and even adult animals in the cracks and hollows and under the bark of logs drawn into the mill from the Wabash. I have at various times kept, or attempted to keep almost all the animals named here in captivity.

*Siren lacertina* (Linn.). Has no local name, being rare. The only specimen I have found was taken in midwinter from the hollow of a log that was rather rotten and filled with mud. I kept it in a barrel partly filled with mud and water. Being neglected, this was frozen over and had to be transferred to the cellar. When it finally thawed out the Siren appeared in no ways injured, but uttered a whistling hiss when touched and ate scraps of meat voraciously. It would eat earthworms and putrid meat, and on one occasion ate a lizard. I once put two laths down in the barrel and on the next day found my pet squirming about on the cellar floor, demonstrating that it could climb a little. It spent most of its time buried in the mud and I rarely saw it without first digging it up. In the eight months that I kept it it made no perceptible growth, yet it ate readily whenever it was dug up and fed. My last experiment was feeding it rancid bacon which it ate with a relish, but it died that night and I concluded that the salt had killed it.

*Cryptobranchus alleghaniensis* (Daudin). Probably rare in this locality. The only one that I have seen was 17 inches long, of dark slate color. Its bite left severe scratches.

*Necturus maculatus* (Raf.). Our commonest salamander. It will eat any kind of animal food. I have read of their biting but could never induce them to do so. Their eggs, laid about the middle of July, are about the size of peas and are quite transparent, offering the best possible material for the study of batrachian embryology. I have found them with their gills missing, apparently bitten off, but have met with no explanation and have none to offer.

*Amblystoma microstomum* (Cope). Common in stagnant pools. A gentle little creature that likes to be scratched or stroked with a feather, and soon learns to take earthworms from the fingers. Its legs are apparently weak, yet it can climb out of an empty tub or bucket. I have seen the larvæ leave the water.

*Amblystoma tigrinum* (Green). Repulsive and bloated in appearance. Adults of livid blue-black color with back covered with yellow spots which blend upon the belly, almost covering the surface. I have

seen the newly hatched young, scarcely more than half an inch in length, feeding upon aquatic animals and even eating coleopterous insects with their hard wing cases.

*Amblystoma punctatum* (Linn.). Slate color, with a row of 7 or 8 yellow spots on each side of body and similar rows on the tail. I kept a female that ate larvæ and earthworms and grew to over 7 inches. She deposited a large number of eggs imbedded in a mass of rather hard jelly, but they did not hatch, not having been fertilized by the male. She swam with her tail alone, holding her legs motionless by her side. When not disturbed she spent much of her time floating on the surface of the water. Her tail was prehensile.

*Amblystoma opacum* (Gravenborst). A sluggish animal. I have never seen the adult enter the water.

*Hemidactylium scutatum* (Schlegel). Brown colored, and rough-skinned. I have seen small ones, but never any with gill slits and have never seen it in the water. Like *A. punctatum* it has a prehensile tail.

*Plethodon cinereus* (Green). Black-backed. Numerous in swampy ground.

*Plethodon erythronotus*. Straight red stripe on back. Quick and active. I have seen them climb the glass sides of a show case in which they were confined.

*Plethodon glutinosus* (Green). Wet, stony ground. Apparently terrestrial, though it is a good swimmer. The prehensile power of its tail is the most highly developed of all of our native Salamanders.

*Spelerpes longicaudus* (Green). It makes an entertaining pet, for it is beautiful and active, takes food readily and moves with an absurd series of wriggles and jerks. The only specimens I have seen were found under logs on the top of a hill, far from water. I kept them in a box of wet moss and they flourished, but some kept by a friend in a dry box, supplied with a little pan of water, soon died.

*Spelerpes maculicaudus* (Cope). Rare, found beneath overhanging rocks.

*Spelerpes bilineatus* (Green). They are active, are good climbers and can jump.

*Diemyctylus viridescens* (Raf.). Common, easily domesticated. Active all the year, even when their ponds are frozen over. They have prehensile tails.

*Desmognathus fusca* (Raf.). Some years ago they were common under stones in Kelso Creek, near Vincennes, but now, with better

drainage, that creek goes entirely dry in the summer and they are, I think, entirely extinct.—ANGUS GAINES.

**List of Snakes Observed at Raleigh, N. C.—1.** *Ancistrodon contortrix*. Copperhead. Rather common here in the wet meadows, although universally known and recognized as the “Highland Moccasin.”

2. *Ancistrodon piscivorus*. Our only specimen of the “Cottonmouth” was killed on Neuse River in the summer of 1891, and in bulk was one of the largest snakes we ever killed here. The length was, I think, 40 inches, although I have unfortunately lost the data connected with it.

3. *Heterodon platyrhinus*. “Spreading Adder.” Common; the black variety is quite rare.

4. *Ophibolus getulus*. “King Snake.” Common; feeds largely and I think usually, on other snakes, even its own species. I forced one to disgorge a meadow mouse a few weeks ago, otherwise its record of snakes for food is unbroken in my experience. It is popularly supposed to be excessively venomous and is also alleged by some to have a sting in its tail which it uses when angry.

5. *Ophibolus doliiatus*. Rather rare; the specimens we get here agree in color with vars. *sypilus* and *coccineus*.

6. *Ophibolus rhombomaculatus*. Rather rare. Feeds on rats and mice judging from the few stomachs examined. Large specimens have the markings very obscure, being nearly uniform in color above. Our largest recorded specimen measures 42 inches.

7. *Cemophora coccinea*. Rare.

8. *Bascanium constrictor*, the Black Snake, is quite common here and is the most courageous of our snakes, frequently standing its ground and fiercely striking at an intruder. It occasionally, at least, eats other snakes.

9. *Coluber obsoletus*. “Chicken Snake.” Not very common. This is the snake most frequently found ascending trees here and so it presumably feeds more on birds than any other. It is also the largest (longest) of our snakes, our largest recorded specimen measuring 74 inches.

10. *Coluber guttatus*. Quite rare here, only two specimens so far collected.

11. *Cyclophis æstivus*. Quite common, particularly in bushes in the low grounds. For some unexplained reason it is popularly considered as extremely venomous.

12. *Diadophis punctatus*. Rather scarce. The few I have personally taken have usually been near the water.

13. *Natrix sipedon*. Our commonest and in bulk our largest snake. Commonly known as "Water Mocassin." We sometimes get specimens uniform dusky above, uniform reddish below.

14. *Regina leberis*. Rather rare. We kept a female this summer for some time, till at last she gave birth to 13 young ones from 7½ to 8 inches long.

15. *Storeria occipitomaculata*. Rather rare.

16. *Storeria dekayi*. Quite common.

17. *Eutainia sirtalis*. Common. Eats frogs, toads and sometimes, at least, small snakes.

18. *Eutainia saurita*. Common. Lives on small frogs and salamanders to some extent.

19. *Haldea striatula*. Common.

20. *Virginia valerieæ*. Quite rare, only seven specimens taken so far.

21. *Carpophiops amœnus*. Common. This and the two preceding are found under logs in the woods and are also sometimes ploughed up.—C. S. BRIMLEY.

**An Abnormal Pes of *Columba livia*.**—During the winter of 1893 I came across a half-bred fantail pigeon whose left pes (Fig. 3) showed a pentadactylous condition. The right pes (Fig. 4), though apparently normal, revealed on dissection, in addition to the free hallux metatarsal element, an extra free metatarsal-like element which was placed median to the hallux metatarsal (Fig. 2).

In the left pes (Fig. 1) there are instead of a normal hallux two separate claws, two parallel phalanges with free ends but fused in the middle region, the proximal free ends articulating with a bilobed metatarsal which is ankylosed to the median surface of the proximal half of the conjoint metatarsals.

In a left pes of a common pigeon given to me by Mr. G. S. Miller, Jr., there were instead of the hallux, two closely appressed clawed phalanges articulating with a metatarsal which was not ankylosed with the conjoint metatarsals. Between this metatarsal and the second digit was apparently a small sixth digit with a well developed phalanx and claw.

S. D. JUDD, Peterboro, N. Y.

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EXPLANATION OF FIGURES, PLATE I (*COLUMBA LIVIA*).

FIG. 1. Ventral view of the skeleton of the left pes, XI.

FIG. 2. Ventral view of the skeleton of the right pes in part, XI.

FIG. 3. Ventral view of the left pes, XI.

FIG. 4. Ventral view of the right pes, XI.

**Zoological News.** INVERTEBRATA.—Students of American forms will find much of interest in Garstang's "Fuanistic Notes at Plymouth."<sup>3</sup> Especially interesting are the notes on the synonymy of the Medusæ, the existence of budding in the Lucernarians, and the notes on the floating fauna, as obtained in the skimming net.

ECHINODERMS.—After a zoological silence of several years, Prof. A. E. Verrill takes up the Starfishes and Brittle Stars, describing<sup>4</sup> some of the species obtained by the U. S. Fish Commission and revising some of the previously described forms. Two new sub-families, two new genera and 15 new species are characterized; some pertinent criticisms are made on some of Sladen's family characters and a consistent revision is given of the ossicles commonly called paxillæ and pseudopaxillæ.

WORMS.—Andrews describes<sup>5</sup> some abnormal annelids, in which the caudal extremity of the body is forked, supplementing a previous paper (this journal, p. 725, 1892). The ten cases described agree in that in all the main axis of the body and all appendages are duplicated. As to the cause of such monsters little definite can be said. It seems probable, however, that they may be produced from adults. After some remarks on regeneration, Dr. Andrews concludes that "here we may suppose that injuries and other external agents affect the regenerative tissue so that the same cells that else had formed one normal terminal now form two more or less separate ones."

CRUSTACEA.—C. D. Marsh describes<sup>6</sup> two new species of *Diaptomus*, one from Mississippi, the other from Wisconsin.

Mr. Edgar J. Allen has just published<sup>7</sup> three of the most careful pieces of work as yet done on the histology and physiology of the nervous system of the Crustacea. The work was carried out on the lobster by means of the Methelyne blue and the rapid Golgi methods. Among the points brought out are the recognition of these nerve ele-

<sup>3</sup> Journ. Biol. Assoc. United Kingdom, iii, 210, 1894.

<sup>4</sup> Proc. U. S. Nat. Mus., xvii, 245, 1894.

<sup>5</sup> Quarterly Jour. Micros. Sci., xxxvi, 435, 1894.

<sup>6</sup> Trans. Wisc. Acad. Sci. and Arts, x, 1894.

<sup>7</sup> Quar. Jour. Micros. Soc., xxxvi, 461, 1894.



ments: 1. Co-ordinating elements which lie entirely in the ganglionic chain. 2. Motor elements in which the ganglion cell is in the chain, the fibre running out at a lateral root. 3. Sensory elements, consisting of cells outside the chain and fibres running from them to the chain. The stomatogastric nerve is also studied and the beading of nerve fibres, etc., is discussed.

ARACHNIDA.—Emerton has gathered several collections of Canadian spiders and publishes<sup>8</sup> a list with annotations and descriptions of new species. The close similarity of the Canadian fauna with that of New England is noted. "Out of 61 species, from Labrador to Manitoba, 56 species live in New England; and out of 48 species from the Rocky Mountains, 27 have been found in New England."

HEXAPODA.—M. H. Wellman has studied the prothorax of Butterflies<sup>9</sup> and finds that four different types of structure, corresponding to the four recognized families, exist. In the first (Nymphalidæ) the chitinized dorsal lobes of the prothorax are large, almost filling the space between the head and mesothorax. In the second class (Papilionidæ) the dorsal lobes are smaller while the scutellum has increased in size. This class is capable of division into three groups. In the Lycænidæ, the third class, the prothorax is very narrow, and the parts inconspicuous. In the last (Hesperiidæ) the lobes are scale-like.

W. A. Snow publishes<sup>10</sup> a synopsis of the American Platypezidæ. This Dipterous family is rare in America, but in an expedition to New Mexico the University obtained seven species, six of which are regarded as new.

FISHES.—Eigenmann and Beeson publish<sup>11</sup> a revision of the Pacific coast species of the Sebastinæ. The outline of the classification adopted was published in this journal for July, 1893.

E. W. L. Holt continues<sup>12</sup> his North Sea investigations. The subjects treated are (I) the destruction of immature fish, especially of plaice, haddock, and cod. He shows that great injury is being done. (III) A differentiation of a new species of ray (*Raja blanda*). (IV)

<sup>8</sup> Trans. Conn. Acad. Science, ix, p. 400, 1894.

<sup>9</sup> Kansas Univ. Quarterly, iii, 137, 1894.

<sup>10</sup> Kansas Univ. Quarterly, iii, 143, 1893.

<sup>11</sup> Proc. U. S. Nat. Mus., xvii, 375.

<sup>12</sup> Jour. Biol. Association United Kingdom, iii, p. 169, 1894.

The recessus orbitalis, an accessory visual apparatus in flat fishes. This consists of a diverticulum of the orbital cavity, innervated by the facialis, and is supposed to play a part in the protraction and retraction of the eye. (V) A description of a sole with symmetrical eyes. (VI) The reproduction of the Scad (*Caranx trachurus*) which oviposits in May, the eggs being pelagic and containing an oil globule, the yolk being broken up into spherules. (VII) A dwarf variety of the Plaice in which it appears that the forms with ciliated scales are males, those with smooth scales females.

J. T. Cunningham describes<sup>13</sup> the young stages of *Zeugopterus punctatus* in which he discusses the relation of various Pleuronected young. He also describes the experiments carried on in the Plymouth laboratory in rearing fish larvæ.

Evermann has been studying the salmon fisheries of the Columbia River basin and clearly shows<sup>14</sup> that extensive damage has already been done by over fishing and especially by fishing throughout the whole of the run. The commissioner suggests the stoppage of fishing during September and October, by laws passed by all of the states interested. A valuable annotated list of all the fishes collected is given in which several new species are described.

BATRACHIA.—Grönberg and von Klinckowström publish<sup>15</sup> an account of the structure of the Surinam Toad, *Pipa americana*. Integument, including the pouches for the young, digestive, respiratory, urogenital, nervous and vascular systems are described.

REPTILIA.—As a result of an osteological investigation Baur concludes<sup>16</sup> that the genus *Anniella* must be placed in a separate family, very close to the Anguidæ, and has its closest relative in *Anguis* itself. Figures are promised in a forthcoming paper on the morphology of *Amphisbænia*.

Dr. Einar Lænborg of the University of Upsala, spent nearly a year collecting in Florida. A list of Reptiles and Batrachians col-

<sup>13</sup> Jour. Biol. Assoc., iii, 202, 1894.

<sup>14</sup> Rept. Commiss. of Fish and Fisheries on Investigations in the Columbia River Basin, Washington, 1894.

<sup>15</sup> Zool. Jahrbücher. Abth. Anat., vii, 1894.

<sup>16</sup> Proc. U. S. Nat. Mus., xviii, 348, 1894.

lected has now been published.<sup>17</sup> No new species are described. The notes on the poisonous character of *Elaps fulvius* are interesting.

BIRDS.—Menke catalogues<sup>18</sup> the birds of Finney Co., Western Kansas. Three species are added to the fauna of the State: *Carpodacus frontalis*, *Piranga ludoviciana* and *Hesperocichla nœvia*.

Ridgway describes<sup>19</sup> *Zosteropes aldabarensis*, *Z. gloriosæ*, *Cinnyris aldabarensis*, *C. abbotti*, *Centropus insularis* and *Caprimulgus aldabarensis*, from Islands of the Malagassy region. In the same volume<sup>20</sup> he adds twenty-two new species to the Avian fauna of the Galapagos Islands.

MAMMALS.—True describes<sup>21</sup> as new species of North American mammals, *Sciurus aberti concolor*, *Scapanus dilatus*, *Myodes nigripes* and *Mictomys* (n. g.) *innuitus*. *Parascalops* is a new genus proposed for *Scalops breweri*. The same author also describes<sup>22</sup> *Sminthus flavus* as new from Kashmir, and from North America<sup>23</sup> four new species of wood rats (*Neotoma*).

<sup>17</sup> Proc. U. S. Nat. Mus., xvii, 317, 1894.

<sup>18</sup> Kansas Univ. Quarterly, iii, 127, 1894.

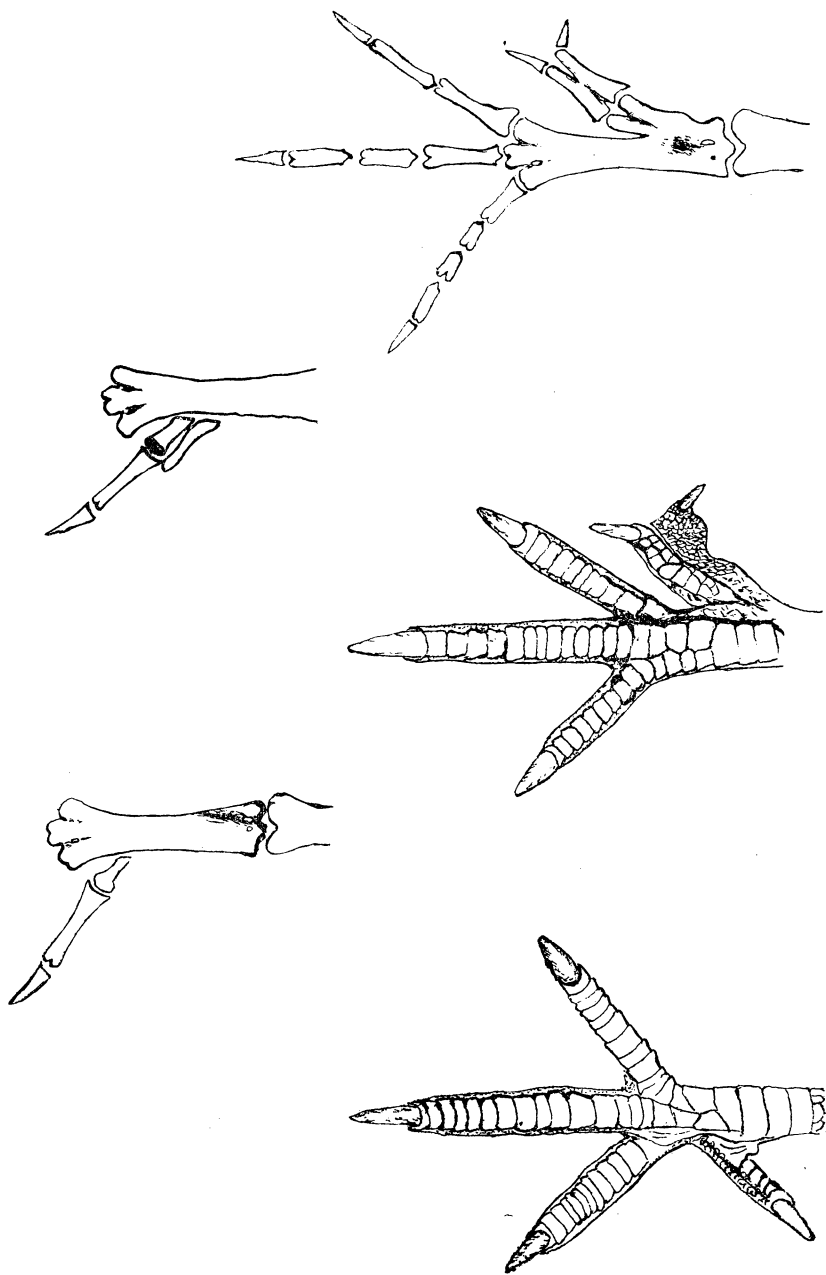
<sup>19</sup> Proc. U. S. Nat. Mus., xvii, 371, 1894.

<sup>20</sup> t. c. p., 357.

<sup>21</sup> Proc. U. S. Nat. Mus., xvii, 241, 1894.

<sup>22</sup> tom. cit., p. 341.

<sup>23</sup> tom. cit., p. 353.



Abnormal foot of *Columba livia*.